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**In Situ Methane Measurements Over Ocean Bottom Methane Seeps -  
Are All Our Current Measurements Too Low?**

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Detection of surface seeps was one of the earliest exploration tools used in finding land-based oil and gas deposits. Detection of oceanic methane seeps is much more difficult because oceanic gas seeps are often not visible and very little of the ocean floor has been explored. Yet recent evidence suggests that the overall volumes of oil and gas venting from the ocean may be much larger than previous estimates.

We report recent data on methane measurements around a bubbling gas seep, Green Canyon, the Northern Continental slope of the Gulf of Mexico. We compare:

- a) methane concentrations in waters collected with a sampler capable of maintaining dissolved gases at in situ temperatures and pressures while aliquots are taken for analysis  
in comparison to: methane dissolved in:
  - b) bottom waters over the natural seep taken through the walls of a manned submersible;
  - b) water taken via Niskin bottles from surface ships; and
  - c) in situ pore water samples taken both at and adjacent to the gas bubbling site.

Even with the in situ measurements, methane concentrations were about 1000 times less than saturation bubble pressures which must have been present within methane bubbles venting from the seafloor. We conclude that methane concentrations fall off very rapidly even within a meter of a gas saturated venting site. These measurements demonstrate:

- 1) the difficulty of obtaining valid methane concentrations around these very heterogeneous gas seep sites and
- 2) the great need for continuous methane sensing devices to deal with the large spatial and temporal variability of these systems.

These measurements raise an important question: are many (or most) of our present day measurements of oceanic methane too low?